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October 14, 2015

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CONFIDENTIAL TREATMENT REQUESTED
REDACTED COPY – FOR PUBLIC INSPECTION

Via ECFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: *Ex Parte* filing of Kathrein Automotive GmbH & Co. KG
Request for Waiver of Section 20.21, WT Docket No. 10-4
REQUEST THAT MATERIALS BE WITHHELD FROM PUBLIC ISPECTION

Dear Ms. Dortch:

Accompanying this letter is a redacted copy of the above-captioned *ex parte* filing by Kathrein Automotive GmbH & Co. KG ("Kathrein") (the "Materials"). Due to the proprietary nature of the redacted portion of the Materials, Kathrein requests that the unredacted version of the letter be withheld from public inspection and not be placed in the Commission's public files, pursuant to Section 552(b)(4) of Part 5 of the U.S. Code and Sections 0.459(a), (d)(1) and (d)(2) of the Commission Rules.[1]

The redacted portion of the Materials contains information qualifying as trade secrets and commercial information that would not routinely be made available for public inspection.

[1] 5 U.S.C. § 552(b)(4); 47 C.F.R. § § 0.459.

Specifically, on page one of the letter is sensitive information regarding the internal pricing decisions for a Kathrein device. This information involves Kathrein's internal business plan and strategies which, if disclosed to competitors, could be detrimental to Kathrein's business. Non-parties could use knowledge of the information to undermine Kathrein's investments and business plans. Kathrein has taken measures to protect against disclosure to its competitors of the redacted information.[2]

Kathrein is simultaneously filing by hand an unredacted version of the attached letter.

Please direct any questions concerning this request to the undersigned.

Respectfully submitted,

/s/

Laura A. Stefani

Attachment

[2] *See* 47 C.F.R. § 0.457(d); *see also Critical Mass Energy Project v. NRC*, 975 F.2d 871, 879 (D.C. Cir 1992) (concluding that "financial or commercial information provided to the Government on a voluntary basis is 'confidential' for the purpose of Exemption 4 [to the FOIA] if it is of a kind that would customarily not be released to the public by the person from whom it was obtained.").

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October 14, 2015

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SUBJECT TO REQUEST FOR CONFIDENTIAL TREATMENT

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: ***Ex Parte* filing of Kathrein Automotive GmbH & Co. KG**
Request for Waiver of Section 20.21, WT Docket No. 10-4

Dear Ms. Dortch:

Kathrein Automotive GmbH& Co. KG ("Kathrein") hereby provides the following information for the record in support of its request for waiver of the Federal Communications Commission ("FCC" or "Commission") rules.

During a meeting with FCC staff, Kathrein discussed the cost and design difficulties inherent in full compliance. Inclusion of anti-oscillation technology would impose additional costs to consumers for a feature that would never become active during the lifespan of the device. Additional costs connected with the inclusion of anti-oscillation technology arise from the need to use a more powerful microcontroller, additional development efforts, and licensing fees. Kathrein internally estimates that this would increase the price of the OEM component by [redacted]%. However, the actual increase in cost to consumers would likely be much higher, for several reasons. First, car manufacturers tend to introduce new technology in low volume flagship vehicles, to consumers who are "early adopters." Thus, new technology is not offered at a large enough volume to allow for good economies of scale, so costs are higher. Second, car manufactures offer these new technologies in option packages where pricing is set to compensate for "loss leaders," meaning entry model vehicles or packages offered at below cost to entice consumers. Based on Kathrein's industrial experience and internal estimates, because of these factors new technology option mark ups can range from 10-15x the actual cost to the manufacturer.

Car manufacturers also rely on market research to decide whether to offer new technology and to set price targets for OEM supplied components designed to meet sales expectations. When the cost of an OEM component exceeds a set price target, as would be the case here, vehicle manufacturers then decide on a case-by-case basis whether to continue with plans to offer the new technology to consumers. This decision is often based on sophisticated algorithms so that even a small change in price could lead to the technology not being offered to consumers.

Kathrein also wishes to provide further information regarding the resiliency and quality of the compensator. As a general matter, the development and manufacturing processes of all companies involved in automotive manufacturing is optimized to ensure that defects are avoided and reliability is ensured. This is to ensure that there are no malfunctions to critical components at the time of delivery and throughout the average lifetime of the automobile. By virtue of being an automotive OEM device, the compensator is subject to strict automobile industry design standards and testing requirements to consider and avoid potential failures. These are the same standards and testing applied to critical safety components such as brakes and collision warning systems.

Specifically, the ISO standard TS 16949 applies to all OEM suppliers globally. This standard requires yearly independent audits to demonstrate that an OEM supplier meets development quality and production quality standards. It also sets out major product development process requirements:

- New product development project planning based “stage gate process” (5 gates)
- Development and production quality rating for each gate exit requirement
- Documented system requirements engineering
- Electrical and mechanical test reports for each sample stage
- Documented development reviews for each stage
- Documented customer and field tests
- PFMEA (Process Failure Mode and Effect Analysis)
- PPAP (Production Part Approval Process, requiring use of proven sub suppliers and parts accessories standard ISO TS 16949)
- Documented sample builds on mass production line
- Validation (Environmental, ESD, electrical and mechanical testing) of the sample builds
- Documented lesson learned process[1]

The compensator also must meet strict quality requirements set out by the automobile manufacturer. It must be designed to ensure that it retains full functional capability for at least 15 years or 300,000 kilometers of use. It also must be manufactured with automotive grade components. For all of these reasons, the risk of system failure is exceedingly low.

[1] The attached PowerPoint provides further details on these process requirements.

Kathrein wishes to clarify a point with regard to vehicle collisions. While it is likely that a mobile device would be thrown from the cradle if there were a serious collision, thereby cutting off the “wake up signal” required for transmission, in some designs the power supply to the compensator would not be automatically cut off in the event of a collision. Because of the variation in electrical system designs in some vehicles, Kathrein cannot guarantee that automatic shutoff would always occur following a collision.

Of course, the compensator has a number of technical advantages over typical consumer signal boosters, all of which ensure network protection: 1) The uplink amplifier is not active without proximity signal; 2) There is no uplink amplification without an RF uplink signal from a mobile handset; and 3) The amplifier in the downlink has a rather low maximum absolute output power. For these reasons, the compensator does not have the capability to interfere with the networks.

Please direct any questions to the undersigned.

Respectfully Submitted,

/s/

Laura A. Stefani

Attachment

Fail Safe
KATHREIN Compensator

Background Material for the FCC

OEM Production Process and Test

- Surface mount technology with SPI (solder paste inspection), AOI (artificial optical inspection) and x-ray-analysis
- 100% of parts are pre-tested on board level
  - S-Parameter measurement of all paths
  - Check and calibration of power detectors
- 100% of parts undergo a final test after complete assembly
  - Currents
  - Diagnosis
  - Functional test
    - Band detection
    - Automatic gain control
- Safe launch phase with additional temperature tests

FMEA – Failure Mode and Effects Analysis

- Initially developed by the military, FMEA methodology is extensively used in a variety of industries. The automotive industry began to use the FMEA by the mid 1970s (actual SAE J1739, VDA 4.3 accordingly).

- The FMEA is a design tool used to systematically analyze possible component failures and identify the resulting effects on system operations.

- The FMEA identifies all part failure modes. Its primary benefit is the early identification of all critical system failure modes so they can be eliminated or minimized through design modification at the earliest point in the development effort.

- FMEAs can be performed at the system, subsystem, assembly, subassembly or part level.

FMEA - Major Benefits

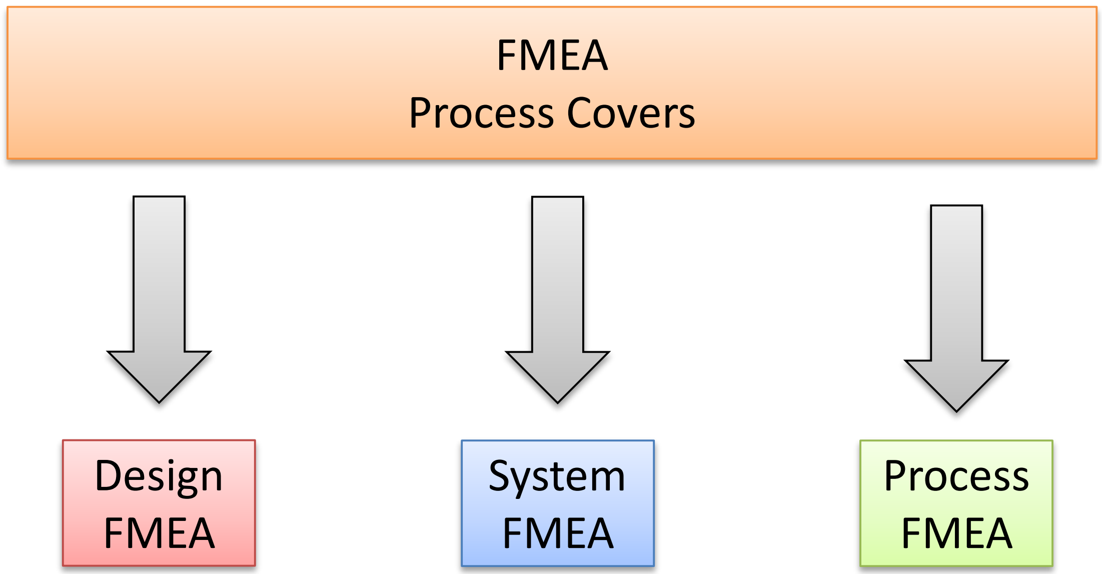
1. A documented method for selecting a design with a high probability of successful operation and safety.

2. Early identification of single failure points which may be critical for operation and safety.

3. Documented uniform method of assessing potential failure mechanisms, failure modes and their impact on system operation, resulting in a list of failure modes ranked according to the seriousness (severity) of their system impact and likelihood of occurrence.

4. Criteria for early planning of practical tests of the equipment.

FMEA - The Process

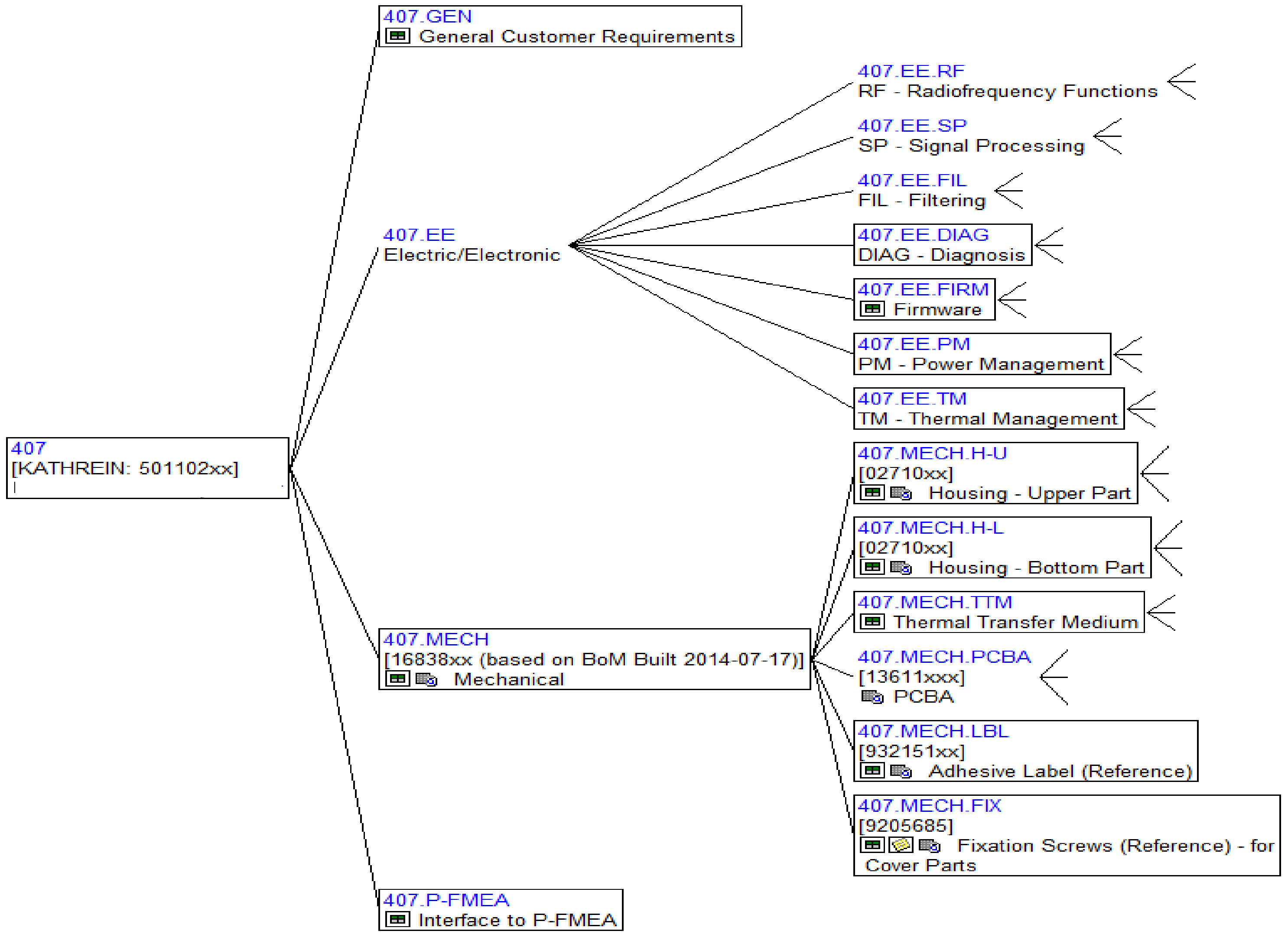


Design FMEA: Focuses on how product designs might fail. Analysis of the compensator to identify any possible hardware failure mode up to the lowest part level based on a hardware breakdown (Bill of Material) done by KATHREIN Automotive.

System FMEA: Focuses on how interactions among systems might fail. Analysis of integration into the complete car-system done by OEM.

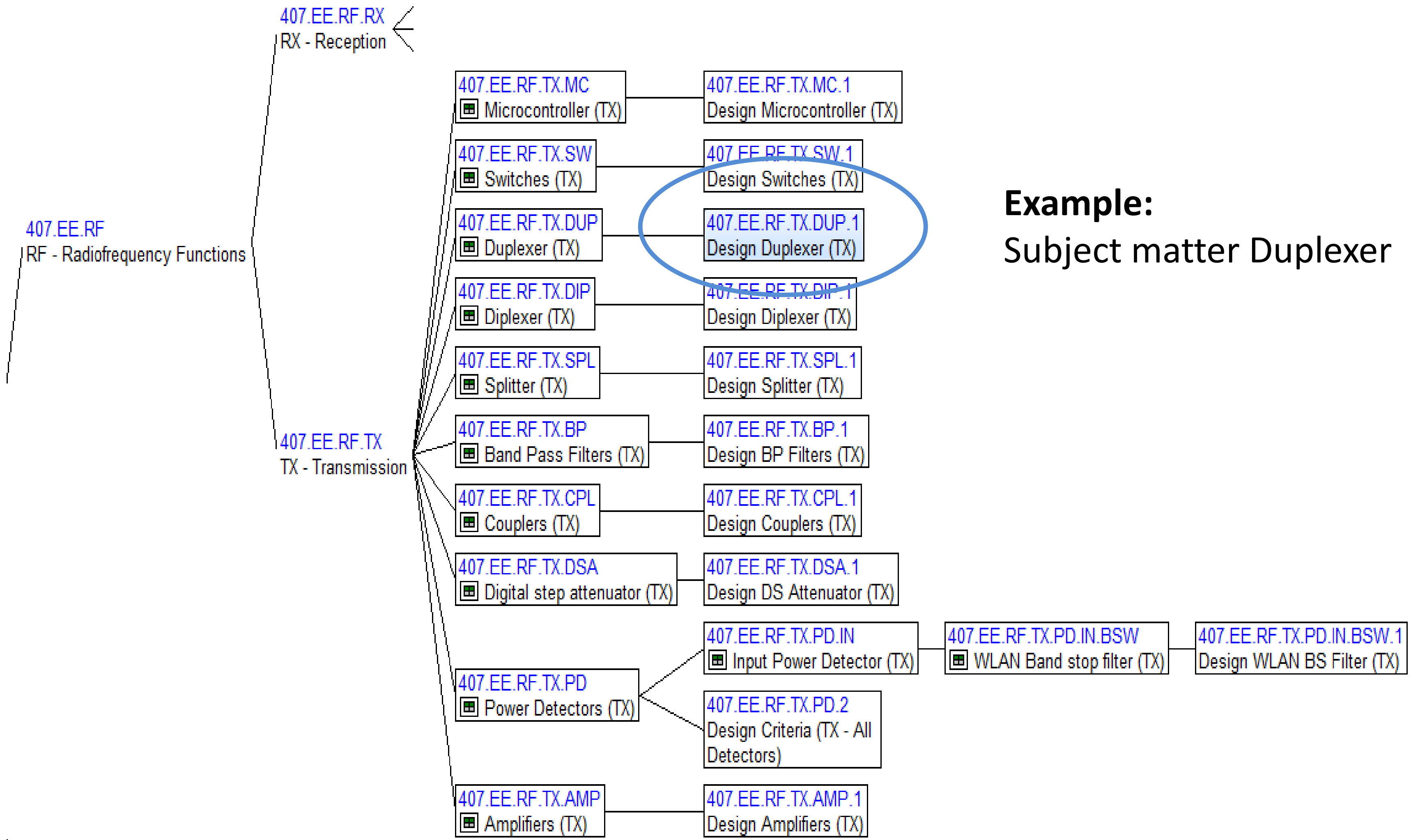
Design FMEA: Analysis of manufacturing and assembly processes of the compensator done by KATHREIN Automotive Portugal.

FMEA – Structure Overview Design FMEA Compensator



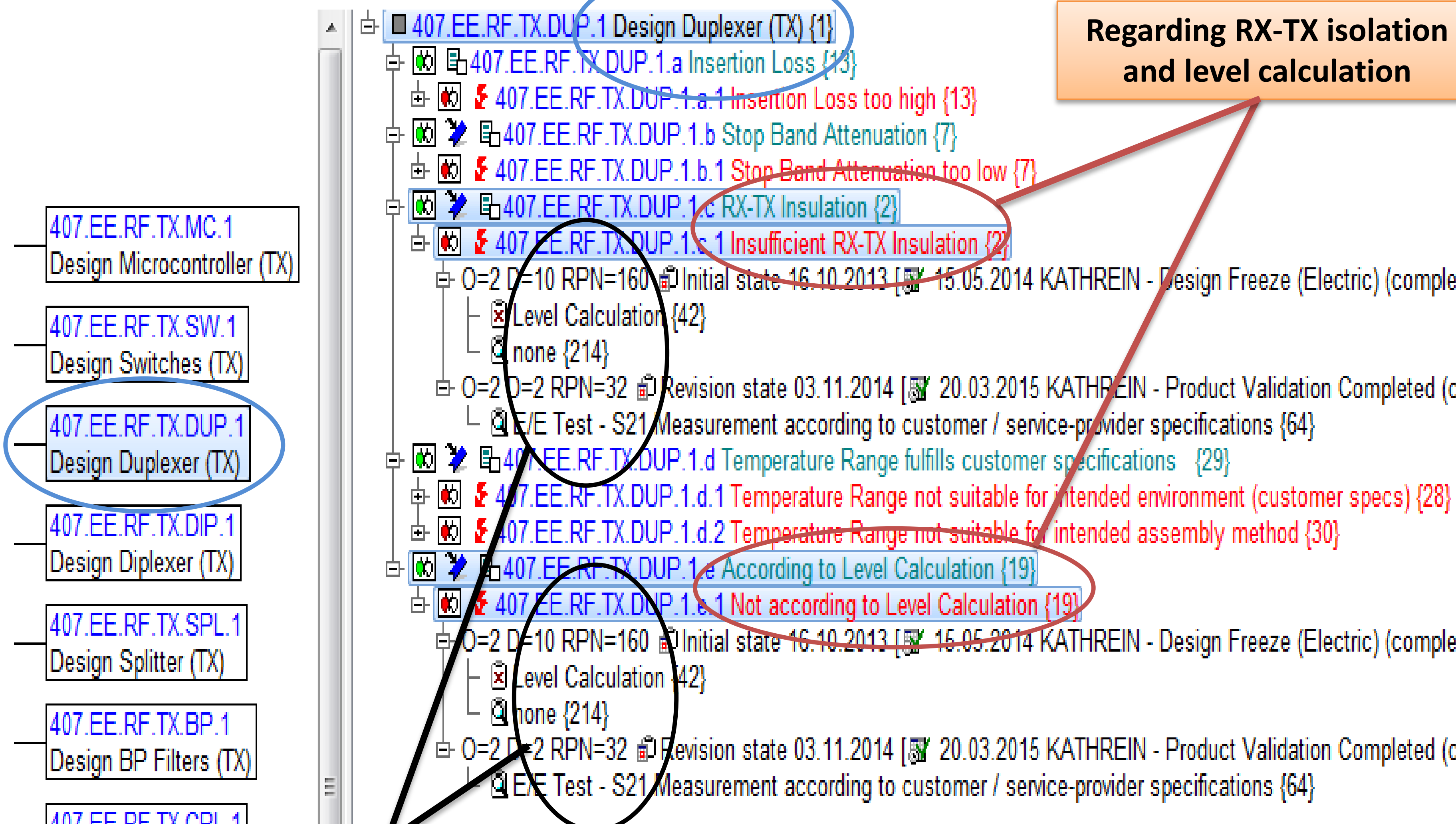
KATHREIN Automotive

FMEA – Excerpt TX-Transmission Section



Example:
Subject matter Duplexer

FMEA – Excerpt Duplexer Design

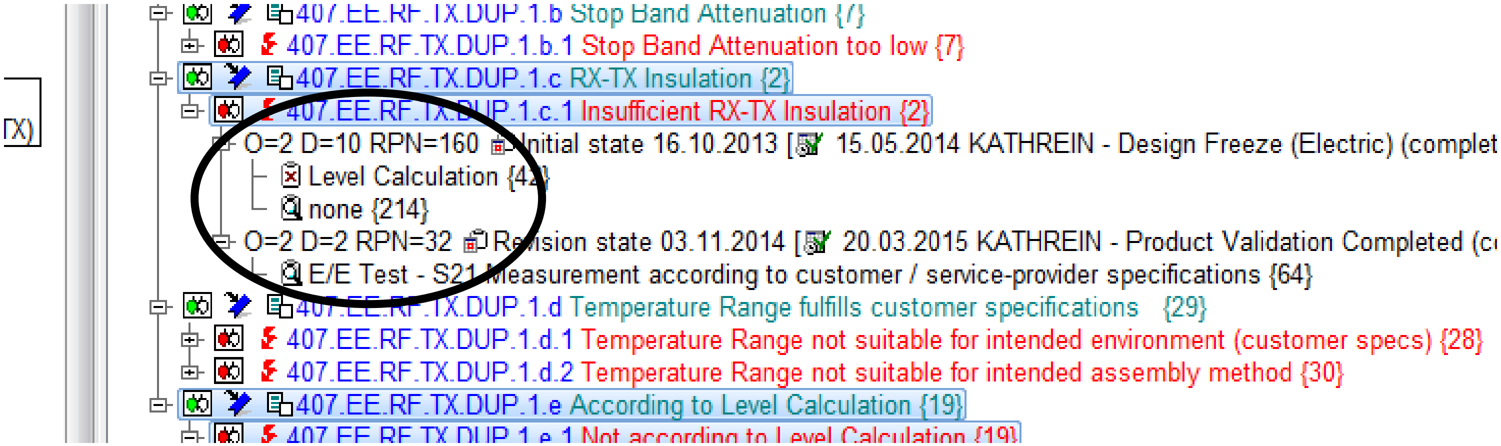


Regarding RX-TX isolation and level calculation

RPN (Risk Priority Number) = Severity x Occurence Possibility x Detection Possibility

KATHREIN Automotive

FMEA – Assessing Risk with Risk Priority Number (RPN)



At Design Freeze Stage: RPN = 160

Detection action: Product Validation

Resulting RPN = 32

Best practice automotive industry:
RPN < 100

Rule: We always address high severity failure modes regardless of their overall RPN values.

Validation Tests

Validation verifies the quality of the product over a car‘s lifetime of 15 years

Validation tests include:

- Temperature exposure (short and long term)
- Mechanical shocks and vibration with and without temperature variation
- Humidity (with and without condensation)
- Dust & chemical exposure
- Functional electrical tests with and without temperature variation
- EMC and ESD tests

Typical duration is 3 months

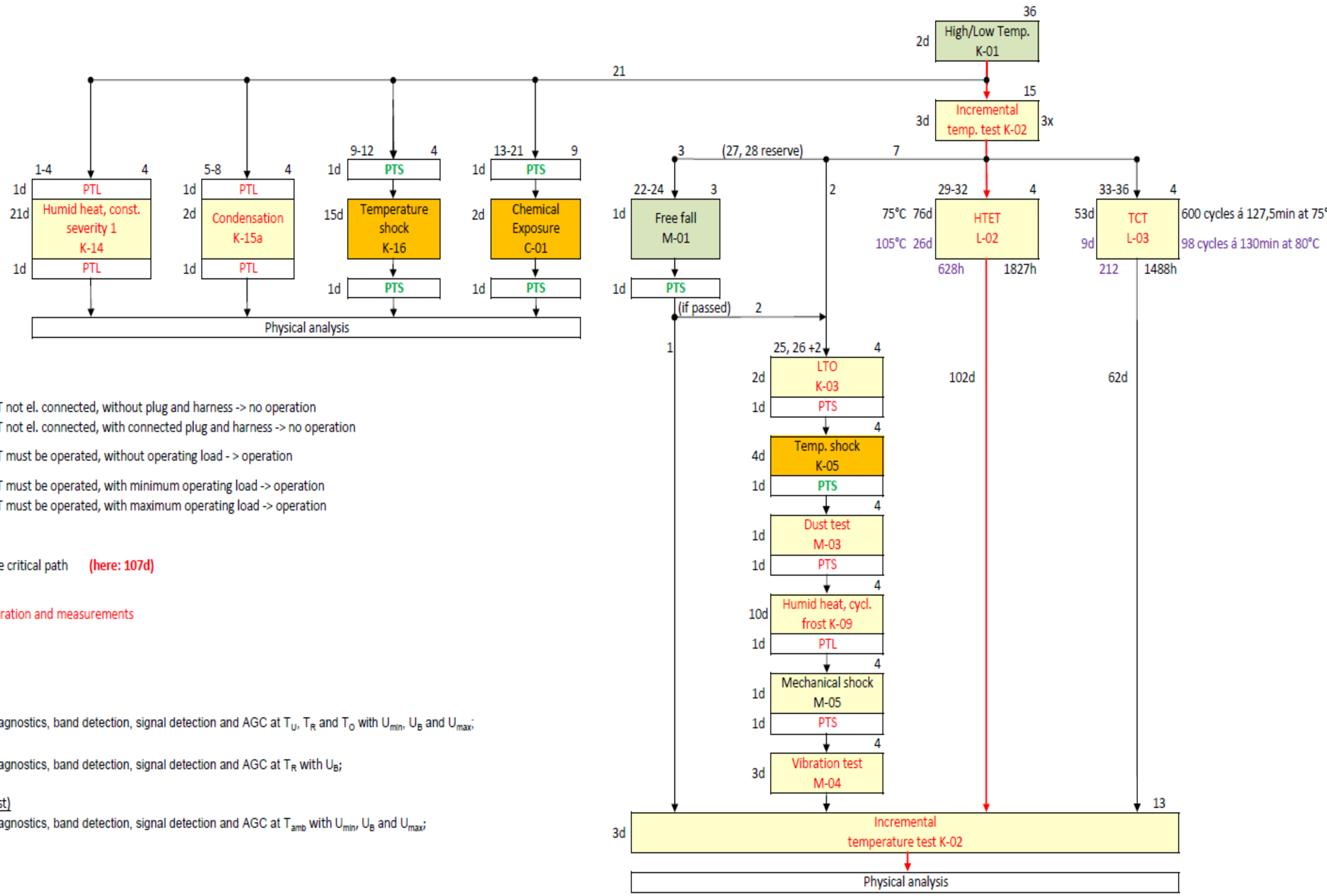
Validation Tests

The product validation is based on three pillars

Product Validation

- Environmental Validation
- EMC/ESD Validation
- Electrical / Functional Validation

Environmental Validation



Operation mode:

I.a	DUT not el. connected, without plug and harness -> no operation
I.b	DUT not el. connected, with connected plug and harness -> no operation
II.a	DUT must be operated, without operating load - > operation
II.b	DUT must be operated, with minimum operating load -> operation
II.c	DUT must be operated, with maximum operating load -> operation

time critical path **(here: 107d)**

Test — operation and measurements

Parameter test large (PTL)
Measuring of current, gain, diagnostics, band detection, signal detection and AGC at T_U, T_R and T_O with U_{min}, U_B and U_{max};
Parameter test small (PTS)
Measuring of current, gain, diagnostics, band detection, signal detection and AGC at T_R with U_B;

Parameter test (functional test)
Measuring of current, gain, diagnostics, band detection, signal detection and AGC at T_{amb} with U_{min}, U_B and U_{max};

KATHREIN Automotive

Electrical Tests acc. GS 95024-2-1

- E-01 Long-term overvoltage
- E-02 Transient overvoltage
- E-03 Transient undervoltage
- E-04 Jump start
- E-05 Load dump
- E-06 Superimposed alternating voltage
- E-07 Slow decrease and increase of the supply voltage
- E-08 Slow decrease, quick increase of the supply voltage
- E-09 Reset behavior
- E-10 Short interruptions
- E-11 Start pulses
- E-12 Voltage curve with intelligent generator control
- E-13 Pin interruption
- E-14 Connector interruption
- E-15 Reverse polarity
- E-16 Voltage offset
- E-19 Closed-circuit current

EMC Tests acc. GS 95002-3

- 4.2 RF-emissions -- Measurements at the artificial network (AN)
- 4.3 RF-emissions -- Measurement with antennas (RE)
- 4.4 RF-emissions -- Capacitive voltage measurement (CV)
- 4.5 RF-Emissions -- Measurement with the current probe (CP)
- 5.3 RF-immunity to interference -- Using antenna (ALSE)
- 5.4 RF-immunity to interference – Stripline method (STR)
- 5.5 RF-immunity to interference -- Bulk current injection (BCICL)
- 5.7 Transients on supply lines (TSUP)
- 5.9 Electrostatic discharge -- Handling Test (ESDH)
- 5.11 Electrostatic discharge (Powered Up) -- Indirect discharge (ESDI)